

Amendments to the Drawings:

The attached replacement drawing sheet makes changes to Figs. 1A-1C and replaces the original sheet.

Attachment: Replacement Sheet

REMARKS

Claims 15, 16, 19, 20, and 29-45 are pending in this application. By this Amendment, Figs. 1A-1C are corrected; claims 15, 33-36 and 43 are amended and withdrawn claims 1, 4-8, 10-14, 21, 22, 24, 27 and 46-49 are canceled. No new matter is added. In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

Applicant appreciates the courtesies shown to Applicant's representatives by Examiner Graybill in the February 12, 2004, personal interview. Applicant's separate record of the substance of the interview is incorporated into the following remarks.

I. The Drawings Satisfy All Formal Requirements

The Office Action objects to the drawings under 37 C.F.R. §1.183(a). In response, Figs. 1A-1C are corrected to obviate the objection. For example, Figs. 1B-1C now show a first layer 32 and a second layer 34. A dispersion of conductive particles 36 in the second layer 34 is shown at least at Fig. 1A, wherein a magnified drawing of a binder 30 is separately shown. Withdrawal of the objection to the drawings is respectfully requested.

II. The Claims Satisfy Requirements Under 35 U.S.C. §112, First Paragraph

The Office Action at page 3 rejects claims 15, 16, 19, 20, 31, 32, 35-38 and 42-45 under 35 U.S.C. §112, first paragraph, asserting that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, the Office Action at page 3 asserts that the undescribed subject matter of the claimed invention is the claimed genera. The rejection and the assertions are respectfully traversed.

Claims 15, 33-36 and 43 are now variously amended to overcome this rejection. For example, claims 15 and 36 recite "a first layer including a first resin; and a second layer

including conductive particles dispersed only in a second resin." Support for the claimed features are clearly found in the specification at least at pages 3, 4 and 13-17. For example, the specification at page 3, lines 6-11 recites "[w]hen the first layer adheres to the member have the small coefficient of thermal expansion, and the second layer adheres to the member having the large coefficient of thermal expansion, the first and second resins have the coefficients of thermal expansion corresponding to the respective members, and hence, separation hardly occurs" (emphasis added). Claims 16, 19, 20, 31 and 32 depend from claim 16, and claims 37, 38, 42, 44 and 45 depend from claim 36, and are believed to overcome the rejection based upon at least the amendments to claims 15 and 36. At least for the above reasons, Applicant respectfully submits that claims 15, 16, 19, 20, 31, 32, 35-38 and 42-45 contain subject matter which was described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Applicant thus respectfully requests withdrawal of the rejection at page 3 under 35 U.S.C. §112, first paragraph.

The Office Action at page 4 rejects claims 15, 16, 19, 20, 31, 32, 35-38 and 42-45 under 35 U.S.C. §112, first paragraph, asserting that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specifically, the Office Action at page 4 asserts that the specification does not reasonably provide enablement for the genera of claims 15, 16, 19, 20, 31, 32, 35-38 and 42-45 because the binder is claimed in terms of its properties and functions. The rejection and the assertions are respectfully traversed.

Claims 15, 35-36 and 43 are now variously amended to overcome this rejection. For example, claims 15 and 36 recite "a first layer including a first resin; and a second layer

including conductive particles dispersed only in a second resin." Support for the claimed features are clearly found in the specification at least at pages 3, 4 and 13-17. For example, in addition to the above discussions, the specification at page 7, lines 2-9 recites "[i]n this case, the conductive particles 36 may well be dispersed in only the second resin constituting the second layer 34 which adheres to the interconnecting pattern 22. Since the conductive particles 36 are not dispersed in the first resin constituting the first layer 32 adhering to the semiconductor chip 10, the short-circuiting between the electrodes 12 of the semiconductor chip 10 is prevented" (emphasis added). At least for the above reasons, Applicant respectfully submits the specification does clearly provide enablement at least for claims 15, 16, 19, 20, 31, 32, 35-38 and 42-45.

Applicant thus respectfully requests withdrawal of the rejection at page 4 under 35 U.S.C. §112, first paragraph.

The Office Action at pages 5 and 6 rejects claims 30, 32-35 and 38-43 under 35 U.S.C. §112, first paragraph, asserting that the claims fail to comply with the written description requirement. Specifically, the Office Action at page 6 asserts that the undescribed subject matter includes the embodiments comprising the claim 15 limitation of a coefficient of thermal expansion of the first layer being smaller than a coefficient of thermal expansion of the second layer in combination with the limitations of claims 30 and 32-25; and that the undescribed subject matter also includes the embodiments comprising the claim 36 limitation relating to a modulus of elasticity. The rejection and the assertions are respectfully traversed.

As discussed above, Claims 15, 32-35 and 43 are now variously amended to overcome this rejection. For example, claims 15 and 36 recite "a first layer including a first resin; and a second layer including conductive particles dispersed only in a second resin." As discussed above, support for the claimed features is clearly provided in the specification at least at pages 3, 4 and 13-17.

Regarding at least claim 15, the specification at page 3, lines 6-11 recites "[w]hen the first layer adheres to the member have the small coefficient of thermal expansion, and the second layer adheres to the member having the large coefficient of thermal expansion, the first and second resins have the coefficients of thermal expansion corresponding to the respective members, and hence, separation hardly occurs" (emphasis added). Regarding at least claim 36, the specification at page 4, lines 1-7 recites "[i]n this binder, the second resin may be made lower in elasticity than the first resin". Thus, when the second layer adheres to the member having the large coefficient of thermal expansion, the second resin is easy of elongation and has a high flexibility, and hence, separation hardly occurs" (emphasis added). At least for the above reasons, Applicant respectfully submits that claims 30, 32-35 and 38-43 comply with the written description requirement under 35 U.S.C. §112, first paragraph.

Applicant thus respectfully requests withdrawal of the rejection at pages 5 and 6 under 35 U.S.C. §112, first paragraph.

Separately, the Office Action rejects claims 33 and 34 under 35 U.S.C. §112, first paragraph. Claims 33 and 34 are now amended to comport with claim 15. Specifically, claim 33 recites "wherein a silica insulating filler is mixed in the first layer"; and claim 34 recites "a component ratio of the silica insulating filler in the first layer is greater than a component ratio of the silica insulating filler in the second layer." Thus, Applicant respectfully submits that claims 33 and 34 overcome the rejection.

Withdrawal of the rejection at page 6 under 35 U.S.C. §112, first paragraph, is respectfully requested.

III. The Rejection Under 35 U.S.C. §102(e)

The Office Action rejects claims 15, 20, 29, 30, 36, 38-41 and 45 under 35 U.S.C. §102(e) over U.S. patent 6,049,038 to Suzuki. This rejection is respectfully traversed.

Suzuki does not disclose "a first layer including a first resin; and a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer," as recited in claims 15 and 36.

The Office Action at page 7 asserts that Suzuki discloses "a binder 3 electrically connecting the semiconductor chip and the interconnecting pattern." Notwithstanding the Office Action's assertion, Suzuki does not disclose a binder including two layers, the conductive particles being dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer.

Suzuki shows in Fig. 1 an IC chip 2 in contact with a printed circuit board 1 by means of a metal bump 6, but Fig. 1 shows the filler component 4 being aggregated in the sealing resin 3 closer to the IC chip 2, rather than being closer to the printed circuit board 1. Accordingly, Suzuki does not disclose a first layer and a second layer, the second layer having conductive particles dispersed only in a second resin, as recited in claims 15 and 36.

Claims 15 and 36 are not anticipated by Suzuki. Claims 20, 29 and 30 depend from claim 15, and claims 38-41 and 45 depend from claim 36, and thus, claims 20, 29, 30, 38-41 and 45 are also not anticipated by Suzuki. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

IV. The Rejections Under 35 U.S.C. §103(a)

The Office Action rejects claims 15, 16, 20, 30-32, 35-37, 41, 42 and 45 under 35 U.S.C. §103(a) over U.S. Patent 5,120,665 to Tsukagoshi et al. ("Tsukagoshi") and Suzuki; and rejects claims 19 and 44 under 35 U.S.C. §103(a) over Suzuki or Tsukagoshi, and further in combination with U.S. Patent 6,344,696 to Nakamura et al. ("Nakamura"). These rejections are respectfully traversed.

Tsukagoshi does not disclose or suggest "a first layer including a first resin; and a second layer including conductive particles dispersed only in a second resin, the second layer

being disposed closer to the substrate than the first layer, a coefficient of thermal expansion of the first resin being smaller than a coefficient of thermal expansion of the second resin," as recited in claim 15; and "a first layer including a first resin; and a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer, a modulus of elasticity of the second resin being smaller than a modulus of elasticity of the first resin," as recited in claim 36.

The Office Action at page 11 admits that "Tsukagoshi does not appear to explicitly disclose a coefficient of thermal expansion of the first layer being smaller than a coefficient of thermal expansion of the second layer"; and the Office Action at page 12 admits that "Tsukagoshi does not appear to explicitly disclose wherein a modulus of elasticity of the second layer is smaller than a modulus of elasticity of the first layer."

However, the Office Action at page 12 asserts that "the combination of Suzuki and Tsukagoshi discloses a coefficient of thermal expansion of the first layer being smaller than a coefficient of thermal expansion of the second layer, and, as evidenced by Yamada as cited supra, filler induced coefficient of thermal expansion and modulus of elasticity of a resin are inherently indirectly correlated." Notwithstanding the Office Action's assertions, Suzuki in view of Yamada does not cure the deficiencies of Tsukagoshi, and thus, the combination of Tsukagoshi and Suzuki in view of Yamada does not result in "a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer, a coefficient of thermal expansion of the first resin being smaller than a coefficient of thermal expansion of the second resin," as recited in claim 15; and "a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer, a modulus of elasticity of the second resin being smaller than a modulus of elasticity of the first resin," as recited in claim 36.

As similarly argued above against the rejection under 35 U.S.C. §102(e), Suzuki merely shows in Fig. 1 filler components 4 aggregated near the IC chip 2 in the sealing resin 3, the sealing resin 3 forming a common bond between the IC chip 2 and the printed circuit board 1 with metal bumps 6 interposed. Suzuki does not suggest the recited characteristics of the first and second layers, and does not disclose a distinct identification of the first and second layers. Suzuki and Yamada do not furnish the suggestion to modify Tsukagoshi to obtain the claimed first and second layers having the recited layer characteristics.

Nakamura does not cure the deficiencies of Tsukagoshi. Nakamura relates to a semiconductor chip having a bonding face to be mounted onto a board, wherein a low elastic modulus resin layer is provided in contact with the bonding face of the semiconductor chip, but Nakamura does not relate to the claimed features of "a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer, a coefficient of thermal expansion of the first resin being smaller than a coefficient of thermal expansion of the second resin," as recited in claim 15; and "a second layer including conductive particles dispersed only in a second resin, the second layer being disposed closer to the substrate than the first layer, a modulus of elasticity of the second resin being smaller than a modulus of elasticity of the first resin," as recited in claim 36.

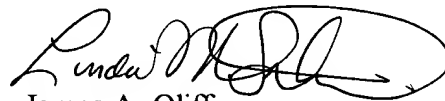
Claims 15 and 36 would not have been rendered obvious by a combination of Tsukagoshi and Suzuki. Claims 16, 19, 20, 30-32 and 35 depend from claim 15, and claims 37, 41, 42, 44 and 45 depend from claim 36, and thus, claims 16, 19, 20, 30-32, 35, 37, 41, 42, 44 and 45 also would not have been rendered obvious by a combination of Tsukagoshi and Suzuki. Furthermore, for the like reasons, claims 19 and 44 also would not have been rendered obvious by a combination of Tsukagoshi and Suzuki, in view of Nakamura. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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Attachment:

Replacement Sheet

Date: November 1, 2004

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